



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/689,366

10/20/2003

Mark Beaumont

DB001071-000

4384

57694

7590

05/22/2008

JONES DAY

500 GRANT STREET

SUITE 3100

PITTSBURGH, PA 15219-2502

EXAMINER

JOHNSON, BRIAN P

ART UNIT

PAPER NUMBER

2183

MAIL DATE

DELIVERY MODE

05/22/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/689,366	Applicant(s) BEAUMONT, MARK	
	Examiner BRIAN P. JOHNSON	Art Unit 2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-28 are pending.

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 19 February 2008 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –
(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 5, 10-13, 16, 21, 22 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Taylor (U.S. Patent No. 4,992,933).

Art Unit: 2183

4. As per claim 1, Taylor teaches a method for generating [a] reflection of data in a plurality of processing elements, comprising:

shifting the data along either the rows or columns of the plurality of processing elements arranged in an $N \times N$ array, where N is greater than three (Col. 9 line 65 – Col. 10 line 38 and fig. 7a and 7b) until the processing elements in the rows or columns have received the data originally held by every other processing element in that row or column, respectively; *The examiner asserts that every processing element in the matrix receives data as it is being shifted from a different processing element.*

Collectively, every element receives data held by every element.

selecting from said received data a final output based on a processing element's position. The examiner asserts that data is output after the final West-shift has occurred and that each processing element outputs data based on its location.

5. As per claim 12, Taylor teaches a method for generating [a] reflection of data in an array of processing elements, comprising:

shifting the data along either the rows or columns in the array (Col. 9 line 65 – Col. 10 line 38 and fig. 7a and 7b) a number of times equal to $N-1$ where N equals the number of processing elements in the rows and columns, respectively; *The examiner asserts that for the case where $N=4$, Taylor's invention performs a total of $N-1$ shifts.*

For $n=4$, $1+n/2 = n-1$.

outputting data from each processing element as a function of that element's position in one of the row and column. *The examiner asserts that data is output after the final*

West-shift has occurred and that each processing element outputs data based on its location.

6. As per claims 2 and 13, Taylor teaches the method of claims 1 and 12 additionally comprising one of loading an initial count into each processing element and calculating an initial count locally based on the processing element's location, said selecting being responsive to said initial count. *The examiner asserts that the NEWS setting for each processing element sets the shift count to $1+(n/2)$ (Col. 10 line 18). Further, data is made final (output) after the final shift has occurred, which is resultant on the initial count value.*

7. As per claims 5 and 16, Taylor teaches the method of claims 2 and 13 additionally comprising maintaining a current count in each processing element, said current count being responsive to said initial count and the number of data shifts performed, said selecting being responsive to said current count. *The examiner asserts that Taylor's processor inherently keeps track of the shift count as a current count. If no current count was maintained, the processor may never stop shifting data between processing elements.*

8. As per claims 10 and 21, Taylor teaches the method of claims 1 and 12 wherein said shifting includes a wrap shift. *Fig. 7a and 7b disclose shifting occurring where values wrap from one row/column to the row/column on the other side of the array.*

9. As per claims 11 and 22, Taylor teaches the method of claims 10 and 21 wherein said wrap shift includes shifting data west to east and east to west along rows, [or] includes shifting data north to south and south to north along columns. *Fig. 7b discloses data moving east to west along the row and from west to east as it wraps from the far left column to the far right column.*

10. As per claim 28, Taylor teaches a memory device carrying a set of instructions which, when executed, perform a method comprising: shifting the data along either the rows or columns of the plurality of processing elements (Col. 9 line 65 – Col. 10 line 38 and fig. 7a and 7b) until the processing elements in the rows or columns have received all the data held by every other processing element in that row or column, respectively; selecting data as a final output based on a processing element's position. *The examiner asserts that every processing element in the matrix receives data as it is being shifted from a different processing element. Collectively, every element receives data held by every element. The examiner asserts that data is output after the final West-shift has occurred and that each processing element outputs data based on its location.*

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

Art Unit: 2183

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 6-9 and 17-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor.

13. As per claims 6 and 17, Taylor teaches the method of claims 5 and 16 but fails to disclose wherein said maintaining a current count includes altering said initial count at programmable intervals by a programmable amount.

14. Official Notice is taken that decrementing a counter from an initial value for every iteration of a function is well known in the art.

15. Decrementing an initial value provides the benefit of allowing a comparison to a single known value (ie, zero) in lieu of comparing to a second value stored in a register. By comparing to a known value like zero, no additional storage is required to maintain the comparison value.

16. It would have been obvious to one of ordinary skill in the art at the time of invention to have decremented the initial count value upon each iteration of the shift until the value reached zero.

17. As per claims 7 and 18, Taylor teaches the method of claims 5 and 16 but fails to disclose wherein said initial count is decremented in response to said shifting of data to produce said current count.

18. Official Notice is taken that decrementing a counter from an initial value for every iteration of a function is well known in the art.

19. Decrementing an initial value provides the benefit of allowing a comparison to a single known value (ie, zero) in lieu of comparing to a second value stored in a register. By comparing to a known value like zero, no additional storage is required to maintain the comparison value.

20. It would have been obvious to one of ordinary skill in the art at the time of invention to have decremented the initial count value upon each iteration of the shift until the value reached zero.

21. As per claims 8 and 19, Taylor teaches the method of claims 6 and 18 wherein said selecting occurs when said current count is non-positive. *The examiner asserts that zero is a non-positive value.*

22. As per claims 9 and 20, Taylor teaches the method of claims 1 and 12 additionally comprising maintaining a local count including setting a counter to a first known value. *The examiner asserts that Taylor's processor inherently keeps a shift count for moving data from processing element to processing element. If the count was not maintained, the processor would not know when to stop shifting data.*

23. Taylor fails to disclose counting up from said first known value based on the number of shifts that have been performed, said selecting occurring when a current count equals a target count.

24. Official Notice is taken that incrementing a counter and comparing it to a stored comparison value is well known in the art.

25. Incrementing a local count provides a simple implementation to ensure a function is performed a correct number of times, ensuring proper operation of the processor.

26. It would have been obvious to one of ordinary skill in the art at the time of invention to have incremented a count in Taylor's processor until it matched a stored value required by the NEWS setting to ensure the proper number of shifts was performed.

2. Claims 1, 2, 5, 10-13, 16, 21, 22 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor in view of Kirsch (Pub. No. 2004/0054870).

Regarding claims 1, 12, and 28, If the claim language were to indicate that each element must receive all data of the row or column, then Taylor fails to disclose that limitation.

Kirsch discloses several shift operations that satisfy that limitation (e.g. 5a, 5b). Kirsch also shows array transformation that include shifting one by one across the array in such a way that each data element in the array path receive all the data of that path (e.g. 8a, 8b). Kirsch also states that "the array transformation operation described in figs. 8a and 8b above, is merely one example of a number of array transformation

operations that can be carried out by application of the shift, broadcast, and broadcast operations described above.” (paragraph 168).

Taylor would have been motivated to utilize Kirsch’s shift techniques for the reflection array transformation because it is a simple, flexible and efficient technique for data manipulation.

It would have been obvious at the time of the invention for one of ordinary skill in the art to take the processing system of Taylor and allow the data reflection to utilize the shift operations of Kirsch to assist with the data transformation. As a result, each element would be provided with each data element originally held in that row or column.

The remaining claims are rejected in the same way as the rejection under 35 USC 102, noting this combination.

Allowable Subject Matter

27. Claims 3-4 and 14-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

28. Claims 23-27 contain allowable subject matter over prior art of record.

29. The following is a statement of reasons for the indication of allowable subject matter: Taylor’s processor inherently contains a count value which dictates how data values are shifted from one element to another. Applicant’s processor sets count values for each row or column based on the equations given in claims 3-4, 14-15 and

23. No teaching in the prior art of record discloses using such count values to achieve a matrix reflection.

Response to Arguments

1. Applicant's arguments filed 19 February 2008 have been fully considered but they are not persuasive.

2. Examiner notes that in the first page of Applicant's arguments, it is stated that "amended claim 1 recites that each processing element receives all the data originally held by every other processing element in that row or column." This statement is not entirely true. Claim 1 states, "the processing elements in the rows or columns have received the data originally held by every other processing element in that row or column."

These statements are not entirely equivalent. The claim language allows that "the processing elements" collectively can receive all the required data rather than "each processing element" individually receiving the required data. For this reason, the Taylor rejection has been maintained.

The remaining arguments are moot in view of the rejection in view of Kirsch.

Conclusion

30. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bratt et al. (U.S. Patent No. 6,877,020) disclose performing a matrix transpose by shifting rows and columns a number of times based on the row or column index.

The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian P. Johnson whose telephone number is (571) 272-2678. The examiner can normally be reached on 8-4:30 M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2183

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Brian Johnson/

/Eddie P Chan/

Supervisory Patent Examiner, Art Unit 2183